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| 09/918,645 | 08/01/2001 | Yasuhiko Kojima | 08038.0052 | 2654 |

7590 06/30/2004

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EXAMINER

BUCKER, RICHARD R

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| ART UNIT | PAPER NUMBER |
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1763

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

my

Office Action Summary

Application No.

09/918,645

Applicant(s)

KOJIMA ET AL.

Examiner

Richard Bueker

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 & 13-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 & 6-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 13-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claims 15 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 15, the phrase "the first liquid passage" lacks proper antecedent basis. In claim 19, the phrase "the first gas passage" lacks proper antecedent basis.

Claims 5, 13 and 18-21 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sturm (6,178,925).

Claims 5, 13 and 17-21 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bhandari (6,099,653).

Claims 5, 13 and 17-21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Olson (6,022,416).

Sturm, Bhandari and Olson each discloses a vaporizer connected to a CVD chamber, wherein the vaporizer includes a first passage that feeds raw material in a liquid state into the gas area of the vaporizer, a second passage that feeds a solvent into the gas area of the vaporizer, wherein the second passage is arranged so that the solvent is supplied to the gas area without passing through any portion of the first passage upstream of the end of the first passage. Also, a third passage that feeds a carrier gas to the gas area is provided as recited in claim 18. The solvent of these references is inherently a stabilizer, and can properly be characterized as a stabilizer to the extent recited in claim 5. Alternatively, the apparatus structure of these references is inherently capable of supplying applicants' preferred embodiment of a stabilizer. The recitation of a particular type of material to be supplied to the vaporizer is a recitation of

intended use that does not so limit the present apparatus claims. Regarding claim 17, Bhandari and Olson include a carrier gas source (see Bhandari at Fig. 1, element 22, and Olson at Fig. 1, element 48, and col. 4, lines 6-9) that is connected to the second passage in such a manner that the carrier gas can carry a material that is supplied by the second path into the vaporizer.

Claims 5, 13-15, 17 and 19-21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kirlin (5,204,314). Kirlin (see Fig. 1, for example) discloses a vaporizer having a first passage 28 for supplying a liquid raw material to a gas area and a second passage F_1 for supplying a carrier gas. Kirlin teaches (col. 6, lines 19-22) that the carrier gas passage is adapted to supply other desired gaseous components in combination with the carrier gas. The carrier gas passage of Kirlin's vaporizer is adapted for and inherently capable of supplying a "stabilizer" if so desired. It is noted that the claim 5 recitation of "a second passage that feeds a stabilizer" is a recitation of intended use that only requires a second passage that is capable of supplying a stabilizer.

Claims 5, 13-14 and 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt (6,179,925) alone or taken in view of any one of Sturm (6,178,925), Bhandari (6,099,653), Olson (6,022,416) or Kirlin (5,204,314). Schmitt (see Figs. 1, 2 and 4A) discloses a gas phase growth system comprising a CVD reaction chamber for holding a substrate to be processed, a vaporizer 140 that vaporizes a CVD precursor such as an organometallic complex such as $\text{Cu}(\text{hfac})\text{TMVS}$, a gas line 142 communicating the vaporizer with the reaction chamber, and a stabilizer

feeder 600 that feeds stabilizer such as TMVS in a gaseous state to the precursor supply system. Schmitt suggests connecting the stabilizer feeder line 210 (Fig. 2) to the vaporizer 140. The stabilizer line 210 in Fig. 2 is separate from the raw material liquid inlet line. Fig. 2 does not show the details of the interior of the vaporizer 140. It would have been prima facie obvious to connect the line 210 to the gas area of the vaporizer separately from the raw material liquid line because Fig. 2 shows them as two separate lines. Also, Fig. 2 includes another stabilizer feed line 206 that is connected to the raw material feed line, and one skilled in the art would expect that it was unnecessary to provide two stabilizer feed lines to the same raw material feed line. Also, Schmitt teaches at col. 7, lines 4-9 that stabilizer feed lines may be incorporated at any location in the deposition system 100, and in view of that teaching it would have been prima facie obvious to connect the stabilizer feed line to the gas area of the vaporizer 140, which is a location in the deposition system 100. Also, Sturm, Bhandari, Olson and Kirlin all teach that it was known in the art to connect feed lines to a gas area of a vaporizer for feeding materials other than the CVD precursor material (i.e. raw material). It also would have been prima facie obvious to connect the stabilizer feed line of Schmitt directly to the gas area of the vaporizer because Sturm, Bhandari, Olson and Kirlin all teach that an additional material can successfully be added to a vaporizer gas area in that manner.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt (6,179,925), optionally taken in view of any one of Sturm (6,178,925), Bhandari (6,099,653), Olson (6,022,416) or Kirlin (5,204,314) for the reasons stated in the

preceding paragraph, and taken in further view of Hochido (JP 2-214536) (see abstract and Figs. 1 and 2) who discloses a vaporizer in which the liquid raw material supplying passage includes a liquid reservoir chamber and a narrow hole, each arranged in the vaporizer, with a valve member adapted to open and close the narrow hole. Hochido teaches that his integral valve provides desirably constant flow rate control. It would have been obvious to one skilled in the art to use a vaporizer with an integral valve as the vaporizer of Schmitt to gain the advantage of a desirably constant flow rate control as taught by Hochido.

Claims 5, 13, 14, 17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun (6,409,839) taken in view of Yuuki (5,776,254). Sun (Figs. 1-3, for example) discloses a vaporizer system for CVD including an atomizing vaporizer 16 connected to a gasifying vaporizer 19. It is noted that the dictionary definition (copy attached to this office action) of "vaporizer" is "atomizer". The vaporizer 16 is provided with a first passage for supplying liquid raw material 14 and a second passage for supplying a carrier gas 12 to form an atomized liquid that is carried by the carrier gas into the vaporizer 19. Sun does not specifically discuss supplying a "stabilizer" to the vaporizer 16. Yuuki (see Fig. 4, col. 8, lines 10-33 and col. 14, line 53 to col. 15, line 28) also discloses a vaporizer system for CVD in which a liquid raw material 5 is mixed with a carrier gas 56, and the carrier gas carries the raw material into a gasifying vaporizer 4. Yuuki teaches that the addition of solvent to the carrier gas stabilizes (col. 15, lines 27-28) the vaporization process, and thus the solvent can be considered a "stabilizer". It would have been obvious to one skilled in the art to include

a solvent in the carrier gas that is supplied to the vaporizer 16 of Sun, because Yuuki teaches that including a solvent in a carrier gas stream prior to combining the carrier gas with liquid raw material will desirably stabilize the vaporization process over a long time.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sun (6,409,839) taken in view of Yuuki (5,776,254) for the reasons stated in the preceding paragraph rejection, taken in further view of Hochido (JP 2-214536). Hochido discloses a vaporizer in which the liquid raw material supplying passage includes a liquid reservoir chamber and a narrow hole, each arranged in the vaporizer, with a valve member adapted to open and close the narrow hole. Hochido teaches that his integral valve provides desirably constant flow rate control. It would have been obvious to one skilled in the art to use a vaporizer with an integral valve as the vaporizer of Sun to gain the advantage of a desirably constant flow rate control as taught by Hochido.

Applicants have argued that Schmitt does not disclose a second passage that feeds a stabilizer to a gas area of a vaporizer without passing through any portion of a first passage upstream of a first passage. It is noted, however, that it would have been prima facie obvious to connect the line 210 of Schmitt to the gas area of the vaporizer separately from the raw material liquid line because Fig. 2 shows them as two separate lines. Also, Fig. 2 includes another stabilizer feed line 206 that is connected to the raw material feed line, and one skilled in the art would expect that it was unnecessary to provide two stabilizer feed lines to the same raw material feed line. Also, Schmitt teaches at col. 7, lines 4-9 that stabilizer feed lines may be incorporated at any location

in the deposition system 100, and in view of that teaching it would have been prima facie obvious to connect the stabilizer feed line to the gas area of the vaporizer 140, which is a location in the deposition system 100. Also, newly cited Sturm, Bhandari, Olson and Kirlin all teach that it was known in the art to connect feed lines to a gas area of a vaporizer for feeding materials other than the CVD precursor material (i.e. raw material) without connecting them to the raw material feed line. It also would have been prima facie obvious to connect the stabilizer feed line of Schmitt directly to the gas area of the vaporizer because Sturm, Bhandari, Olson and Kirlin all teach that an additional material can successfully be added to a vaporizer gas area in that manner.

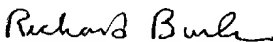
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Richard Bueker
Primary Examiner
Art Unit 1763